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(56) Documents Cited

JP 110256574 A JP 110181770 A JP 110081308 A

(58) Field of Search

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(54) Abstract Title

Method of forming a pile using an anchor

(57) Method of forming a pile comprises screwing a tubular casing 9 having helical flights 10 into the ground 11 to form an anchorage, attaching a piling rig 1 to the anchorage, and using the rig 1 in forming a pile which extends down through the tubular casing 9 into the ground. A pilot hole may be bored prior to the screwing of the casing 9. Clamping means 12 secure the rig 1 to the anchorage. The rig 1 has a tool holder 3 movable upwards and downwards on which a rig rotation 6 unit is mounted. The anchorage can be unscrewed after the bore has been formed and reused.

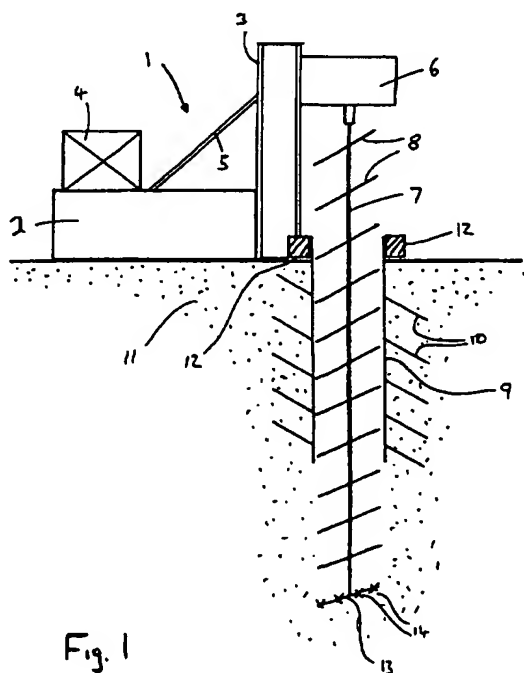
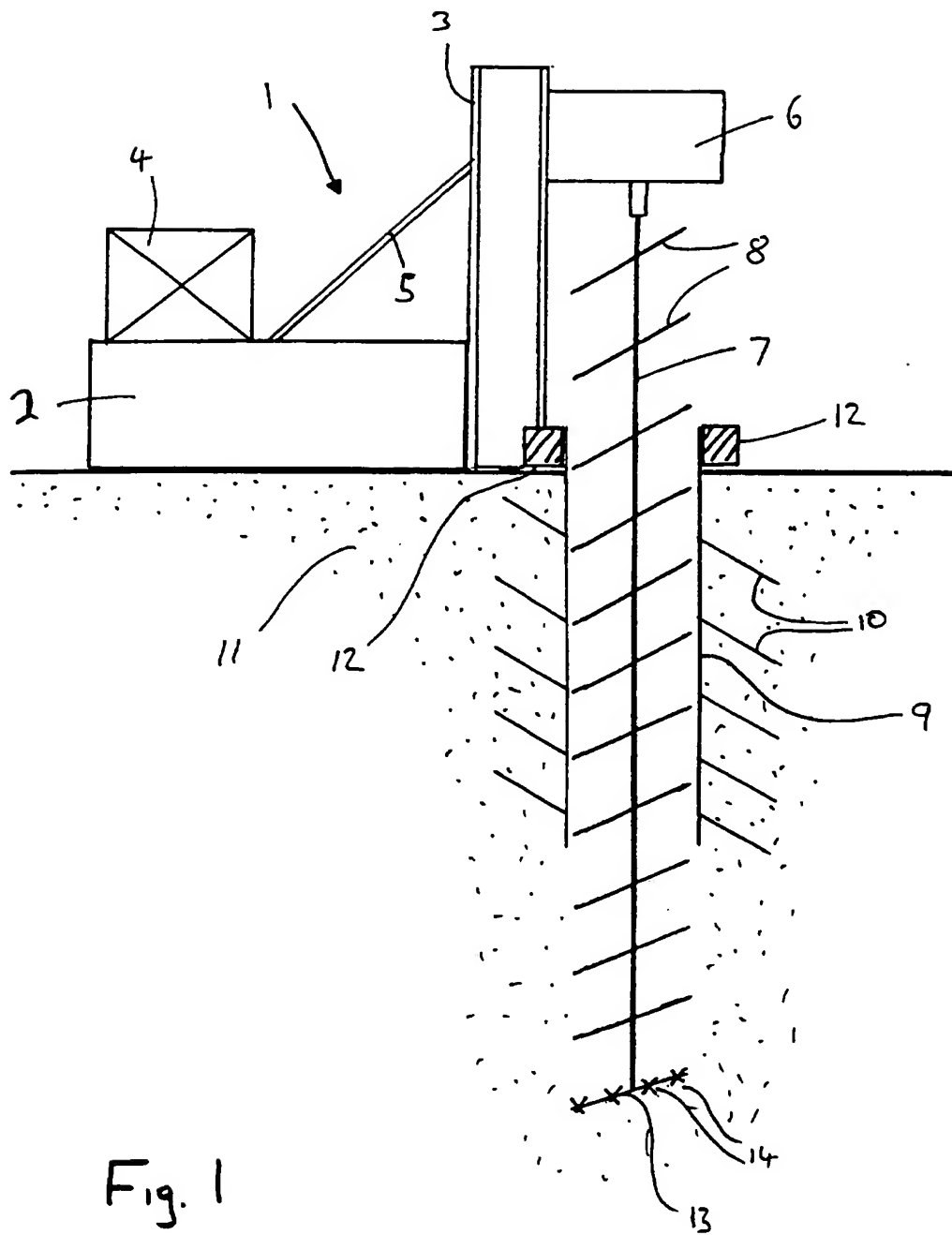


Fig. 1

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IMPROVEMENTS RELATING TO PILES

The invention is concerned with the construction of a pile, of the kind which may be used for supporting a foundation or an underpinning beam in the repair of a subsided building. Such so-called "mini" piles are typically created either by pushing a solid pile, which may be segmented as described in our GB-A-2299360, downwardly into the ground, or by boring a hole which is subsequently filled with a settable cementitious material, with or without a tubular casing lining the bore hole.

In all cases the pile is pushed down or the hole is bored by tooling carried to a rig at ground level. In driving the pile or boring or lining the hole, the rig has to provide a significant downward pressure. Many piling rigs have to operate in confined spaces close to or sometimes within a building and are therefore small and comparatively light. The mass of a rig is, on many occasions, a key factor in the production of the necessary "crowd" pressure which is exerted on the pile or boring tool. When working in hard ground, there may be a tendency for the rig to lift up rather than to drive the pile or drill into the ground.

According to the present invention, a method of forming a pile comprises screwing a tubular casing having external helical flights into the ground to form an anchorage, attaching a piling rig to the anchorage, and using the rig in forming a pile which extends down through the tubular casing into the ground.

The anchorage increases the effected weight of the rig and therefore increases productivity, especially when working in hard or obstructed ground. In difficult conditions it may be desirable first of all to bore a pilot hole in the ground, and to screw the flighted casing into the pilot hole.

The rig may incorporate a clamp which is secured around part of the anchorage to prevent the rig lifting up relatively to the anchorage.

5 The pitch and depth of the flights will be chosen depending upon ground conditions and the number of flighted casings will also vary depending upon the crowd pressure required which, of course, is ultimately limited by the thrust pressure of the rig. The flights may be welded onto the casing which preferably has a thickness of at least
10 5mm.

A typical rig may be mounted on crawler tracks and have a tool holder which incorporates a hydraulic motor and is movable upwards and downwards on a mast. The tool holder may be used for screwing the flighted casing into
15 the ground to form an anchorage, and subsequently to drive an auger down through the flighted casing to form a bore hole in which settable cementitious material is subsequently placed, together possibly with a tubular lining for the hole. After the pile has been completed the
20 anchorage may be unscrewed and removed for reuse.

It has been found that the casing should have a minimum internal diameter of at least 10mm greater than the external diameter of the auger.

One embodiment of the present invention will now be
25 described with reference to the accompanying drawing which shows a schematic partial cross-sectional view of a drilling rig using the method of the present invention.

Fig. 1 shows a drilling rig 1 comprising a main body 2 which has at one end a mast 3 and at the other end, a
30 balancing mass 4. A strut 5 supports the mast 3 in a substantially vertical attitude.

A rig rotation unit 6 is slidably mounted upon the mast 3. The rig rotation unit 6 drives an auger 7 which is provided with a number of ground penetrating flights 8.

35 When constructing a pile, a tubular casing 9 having external helical flights 10 is first screwed into the ground 11 to form an anchorage. The rig 1 is then attached

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by means of casing clamps 12 to the anchorage. Subsequently, the tool holder drives the auger 7 down through the casing 9 to form a bore hole in which settable cementitious material (not shown) can be placed. The auger
5 7 is provided with a cutting bit 13 having teeth 14. The cutting bit may be specially adapted for the specific ground conditions in which the pile is to be formed.

CLAIMS

1. A method of forming a pile comprises screwing a tubular casing having external helical flights into the ground to form an anchorage, attaching a piling rig to the anchorage, and using the rig in forming a pile which extends down through the tubular casing into the ground.
2. A method according to claim 1, further comprising the step of boring a pilot hole in the ground and then screwing the flighted casing into the pilot hole.
3. A method according to either claim 1 or claim 2, wherein the rig is provided with clamping means which can be secured around part of the anchorage to prevent the rig lifting up relatively to the anchorage.
4. A method according to any one of claims 1 to 3, wherein the rig has a tool holder having a hydraulic motor, wherein the tool holder is movable upwards and downwards on a mast.
5. A method according to any one of the preceding claims, further comprising the step of unscrewing the anchorage after the bore has been formed such that the anchorage can be reused.
6. A method substantially as described with reference to the accompanying drawing.



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Claims searched: 1-6

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Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.R): E1F: FBL, FBM, FCL, FEC E1H: HGB, HGJ
Int Cl (Ed.7): E21B: 3/02, 7/20 E02B: 5/80, 7/22
Other: Online: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	JP 11256574 A, GIKEN SEISAKUSHO	1 at least
X	JP 11181770 A, GIKEN SEISAKUSHO	1,2,3,4 at least
X	JP 11081308 A, GIKEN SEISAKUSHO	1,3,4 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.